

Three New Species of *Davilla* (Dilleniaceae) from Brazil

Gerardo A. Aymard C.

UNELLEZ-Guanare, Programa de R. N. R., Herbario Universitario (PORT), Mesa de Cavacas, Estado Portuguesa, Venezuela 3350. gaymard@cantv.net

ABSTRACT. Three new species of *Davilla* Vandelli from Amazonas, Bahia, and Pará states, Brazil, are described and illustrated. *Davilla bahiana* Aymard resembles *D. cuspidata* Martius but mostly differs by its leaves coriaceous, papillate on the upper surface, with lateral nerves 11 to 19, and carpels strigose at the apex. *Davilla bilobata* Aymard is related to *D. grandifolia* Moricand but can be distinguished by its tertiary nerves deeply areolate on the lower surface, inflorescence shorter (to ca. 5.5 cm), the shape and pubescence of the sepals, and the petals bilobed. *Davilla nei* Aymard was collected inside the study plots of the Biological Dynamics of Forest Fragments Project in central Amazonian lowland forest; it is similar to *D. kunthii* St. Hilaire but differs by its wider leaves (7–)15 cm long, the margins coarsely serrate, short inflorescences (only 10–11 cm long), and carpels densely hispid-incanous. *Davilla bilobata* is a distinctive species for its bilobed petals in a genus with otherwise predominantly entire petals.

Key words: Bilobed petals, Brazil, *Davilla*, Dilleniaceae, IUCN Red List, section *Davilla*, section *Homalochlaena*.

Davilla Vandelli (Dilleniaceae) is a genus of 30 to 40 species native to the Neotropics (Kubitzki, 1971; Aymard, 1998). Species are lianas, vines, or erect or scandent shrubs with sepals unequal in size, the two inner sepals larger, becoming crustaceous and covering the fruit completely when mature, the inflorescence paniculate, and the fruit a capsule. The genus was revised by Kubitzki (1971), and a key to Brazilian species of *Davilla* was recently prepared by Aymard (2002). The following species were discovered during herbarium studies over the past several years by the author and add to the diversity of species of Dilleniaceae in the Brazilian flora, especially in central Amazonian and Bahian forests.

1. ***Davilla bahiana*** Aymard, sp. nov. TYPE: Brazil, Bahia: Santa Cruz de Cabralia, Km 25.6 da Rodovia BR 367 (Eunápolis–Porto Seguro), 150 m, 4 June 1979, *S. A. Mori, R. M. King* & *A. M. de Carvalho 12006* (holotype, CEPEC; isotypes, NY, PORT, US), Figure 1.

Species *Davillae cuspidatae* Martius accedens, sed diversa ramis ramulisque brunnecis, foliis coriaceis 7–15 cm longis, supra papillatis, apice acutis, nervis lateralibus 11 ad 19, petiolis 1–2.5 cm × 3–6 mm, dense adpresse ferrugineo-pubescentibus, sepalis interioribus extus laud papillatis, carpellis apice strigosis.

Woody vine, branches and branchlets brown, covered by long ferruginous-patent trichomes, 1.5–3 mm, glabrescent when mature. Leaf blades coriaceous, 7–15 × 3–6 cm, elliptic or elliptic-obovate, base obtuse, apex acute, margins subrevolute, entire, smooth on both surfaces, sparsely pilose (glabrescent when mature) and papillate on the upper surface, densely patent-pilose along the midrib and secondary nerves on the lower surface, with trichomes ferruginous and spreading, lateral nerves 11 to 19, convergent and anastomosing close to the margin; petioles winged, canaliculate, 1–2.5 cm × 3–6 mm, densely adpressed ferruginous-pubescent. Inflorescence 8–16 cm, peduncle and pedicels patent-ferruginous strigose, pedicels 4–10 mm. Sepals 5, quincuncial, orbicular, the outer 3, 3–6 mm, not papillate, lax sparsely strigose to glabrescent externally, glabrous internally, margins ciliate, the inner 2, 0.8–1.2 cm, glabrous on both surfaces, papyraceous when mature, petals not seen; stamens 80 to 100, filaments ca. 4 mm, glabrous, anthers ca. 0.8 mm, glabrous; carpels 2, glabrous, strigose apically, style ca. 3 mm, glabrous, stigma capitate. Seeds 1 per carpel, 4–5 mm, glabrous, brown, aril white, completely covering the seed.

Distribution and habitat. *Davilla bahiana* is known only from the type locality, in Bahia state, Brazil, where it has been collected in moist forests locally known as “Mata Higrofila Bahiana.”

IUCN Red List category. The type locality of this new species is the unprotected Bahian forests; therefore, using the IUCN Red List criteria (IUCN, 2001), this species should be included in the category VU (Vulnerable). However, the precise conservation status of the population(s) has not been determined because this species is only known by a single collection.

Relationships. Because its internal sepals overlap, *Davilla bahiana* belongs to section *Davilla* Vandelli



Figure 1. *Davilla bahiana* Aymard. —A. Branch with leaves and inflorescences. —B. Flower with an internal sepal removed showing the stamens and the carpels. —C. Abaxial leaf pubescence. Drawn from the holotype, S. A. Mori, R. M. King & A. M. de Carvalho 12006 (CEPEC).

(Kubitzki, 1971). By its branches, branchlets, pubescence along the blade/leaf midrib and secondary nerves on the lower surface, and inflorescences and pedicels covered by patent-ferruginous trichomes, this

new species is similar to *D. cuspidulata* Martius. However, *D. bahiana* is distinguished from the latter by its branches and branchlets brown; leaves coriaceous, 7–15 cm long, papillate on the upper

surface, apex acute, lateral nerves 11 to 19; petioles 1–2.5 cm \times 3–6 mm, densely ferruginous-pubescent; internal sepals not papillate externally; and carpels strigose at the apex. On the other hand, *D. cuspidulata* has branches and branchlets gray; leaves chartaceous to subcoriaceous, 5–8 cm long, not papillate on the upper surface, apex cuspidate, lateral nerves 8 to 10; petioles 0.4–1.5 cm \times 0.5–2 mm, sparsely strigose; internal sepals papillate externally; and carpels completely glabrous.

In Aymard (2002), this species was treated as “*Davilla* sp. A.”

2. *Davilla bilobata* Aymard, sp. nov. TYPE: Brazil. Bahia: Porto Seguro, Reserva da Brasil/Holanda, Km 22 rd. Eunapális to Porto Seguro, 16°27'S, 39°19'W, 6 Apr. 1994, A. M. V de Carvalho, A. M. Amorin, S. C. Sant'Ana & J. G. Jardim 4463 (holotype, CEPEC; isotypes, NY, PORT). Figure 2.

Species *Davillae grandifoliae* Moricand proxima, sed differt foliis basi acutis, nervis tertiariis subtus profunde areolatis, inflorescentia ca. 5.5 cm longa, sepalis orbicularibus extus dense adpresse luteo-pubescentibus, petalis 5, obcordatis, bilobis, staminibus ca. 3 mm longis.

Woody vine, branches and branchlets adpressed-pubescent, glabrescent, striate, the bark flaking off when mature. Leaves coriaceous, 10–20 \times 5–15 cm, elliptic to elliptic-ovate, base acute, apex rounded, shortly acuminate, margins entire or subsinuate, revolute, smooth and sparsely adpressed-pilose on the upper surface, patent-pilose on the lower surface, densely adpressed-pubescent along the midrib and secondary nerves, lateral nerves 15 to 19, straight to the margin, impressed on the upper surface, elevated, tertiary nerves deeply areolate on the lower surface; petioles robust, thick at the base, 1.5–3.5 cm \times ca. 5 mm, subalate, densely adpressed-pubescent. Inflorescence ca. 5.5 cm, rachis, bracteoles, and pedicels densely adpressed yellow-pilose, bracteoles ca. 5 mm, lanceolate, glabrous internally, pedicels 5–10 mm. Sepals 5, unequal, orbicular, outer 3, 5–7 mm, densely adpressed yellow-pubescent externally, glabrous internally, ciliate at the margins, the inner 2, 9–11 mm; petals 5, equal, yellow, imbricate, obcordate, glabrous on both surfaces, ca. 10 mm, bilobed, lobes 3–4 mm. Stamens 120 to 150, filaments ca. 3 mm, glabrous, anthers 0.2–0.3 mm, glabrous; carpels 2, ca. 2 mm, glabrous, style ca. 4 mm, glabrous, stigma capitate. Seeds and fruit not seen.

Distribution and habitat. According to the specimen label, this species is found in the moist Brazilian forest locally called “Mata Higrófila Sul Bahiana.”

IUCN Red List category. Using the IUCN Red List criteria (IUCN, 2001), this species should be included in the category VU (Vulnerable). However, the precise conservation status of the population(s) has not been determined because this species is only known by a single collection.

Relationships. By the internal sepals not imbricate and pressed against each other, *Davilla bilobata* belongs to section *Homalochlaena* Kubitzki (Kubitzki, 1971). By its larger leaves with margins entire or subsinuate and its numerous stamens (120 to 150), this new species appears to be related to *D. grandifolia* Moricand. However, *D. bilobata* differs from the latter by its leaves with tertiary nerves deeply areolate on the lower surface and base acute (vs. tertiary nerves not areolate, blade base rounded or subcordate); inflorescence ca. 5.5 cm long (vs. inflorescence 10–35 cm); sepals orbicular, densely adpressed yellow-pubescent externally (vs. sepals suborbicular, incanous or ferruginous-sericeous pubescent externally); petals 5, obcordate, bilobed (vs. petals 3, obovate-oblong, entire); and stamens ca. 3 mm long (vs. stamens 5–6 mm).

This is the first known species of genus *Davilla* with petals lobulate.

3. *Davilla neei* Aymard, sp. nov. TYPE. Brazil. Amazonas: Manaus, Rodovia BR 174, Km 64, 23 km E on ZF3, Fazenda Esteio, “Projeto Dinâmica Biológica de Fragmentos,” 02°24'S, 59°52'W, 29 Jan. 1992, M. Nee 42366 (holotype, INPA; isotypes, NY, PORT, US). Figure 3.

Species *Davillae kunthii* St. Hilaire propinqua, sed divergens foliis 7–15 cm latis, e late ovato orbicularibus, margine grosse serratis, petiolis 5–6 mm latis, dense adpresse incano-pubescentibus, inflorescentia 10–11 cm longa, sepalis interioribus e late ovato orbicularibus, 3–4 mm longis, petalis 3 ad 4, ovatis, filamentis 2–3 mm longis, carpello dense hispido-incano.

Woody vine, branches and branchlets brownish, densely adpressed incanous-ferruginous, glabrescent, striate, the bark flaking off when mature. Leaf blades coriaceous, 12–20 \times 7–15 cm, ovate, broadly ovate to orbicular, base rounded, apex rounded, shortly acuminate, margins revolute, coarsely serrate, more so in the upper half of the blades, scabrous to verrucose, sparsely pilose, adpressed-pubescent along the midrib and secondary nerves on the upper surface, sparsely ferruginous-pubescent, densely yellow-ferruginous adpressed-pubescent along the midrib, secondary, and tertiary nerves on the lower blade surface, lateral nerves 15 to 18, convergent and linking to the margin, impressed on the upper surface, elevated on the lower surface, tertiary venation areolate on the lower blade

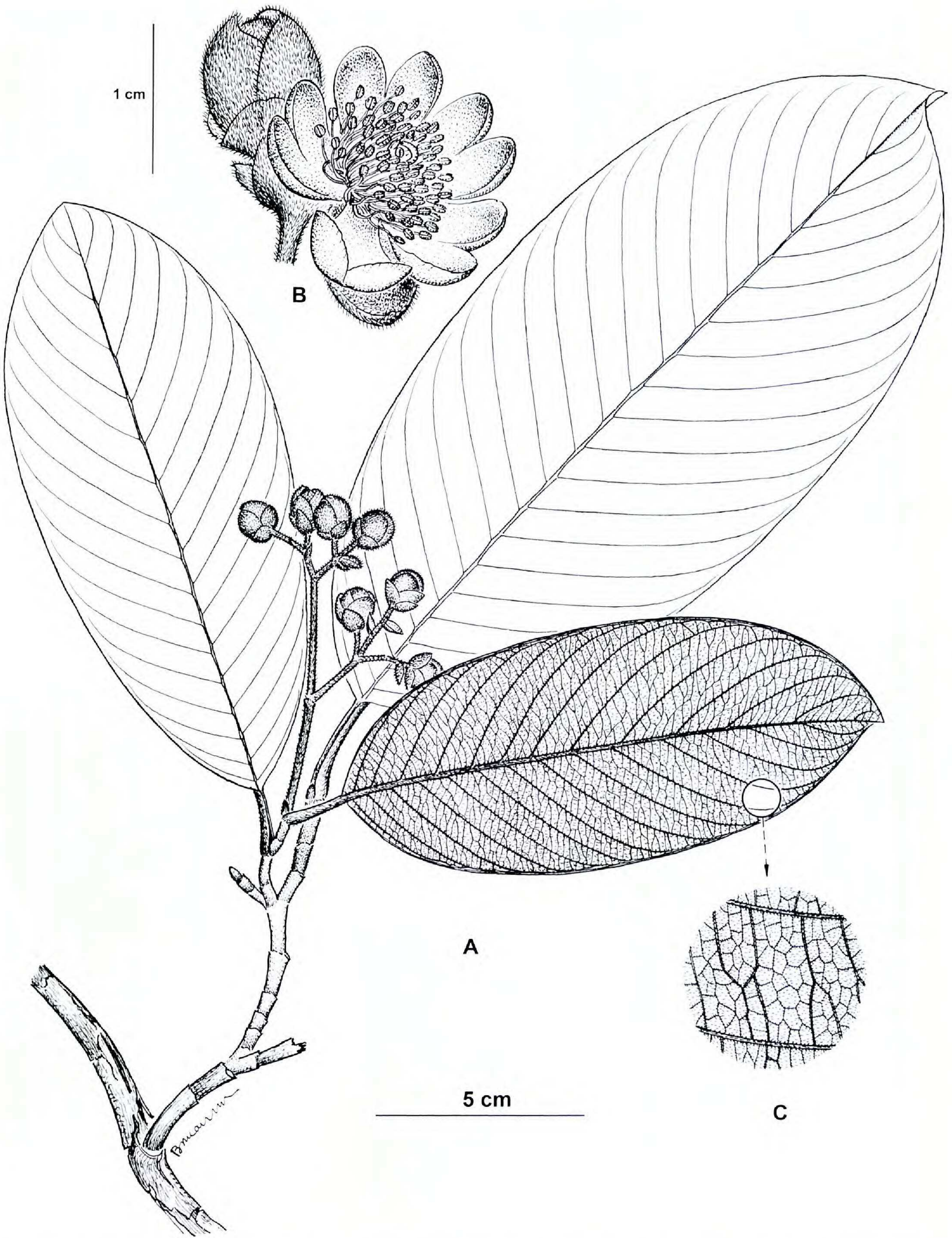


Figure 2. *Davilla bilobata* Aymard. —A. Branch with leaves and inflorescences. —B. Flower showing the stamens and the bilobed petals. —C. Detail of the abaxial leaf. Drawn from the holotype, A. M. V de Carvalho, A. M. Amorin, S. C. Sant’Ana & J. G. Jardim 4463 (CEPEC).

surface; petioles robust, thick at the base, 1.5–3 cm × 5–6 mm, subulate, densely adpressed incanous-pubescent. Inflorescence 10–11 cm, rachis densely adpressed ferruginous-tomentose, bracteoles 4–6 mm, lanceolate or ovate, densely adpressed-ferruginous externally, glabrous internally, pedicels 3–6 mm. Sepals 5, adpressed sericeous-pubescent externally, glabrous internally, ciliate at the margins, the outer 3

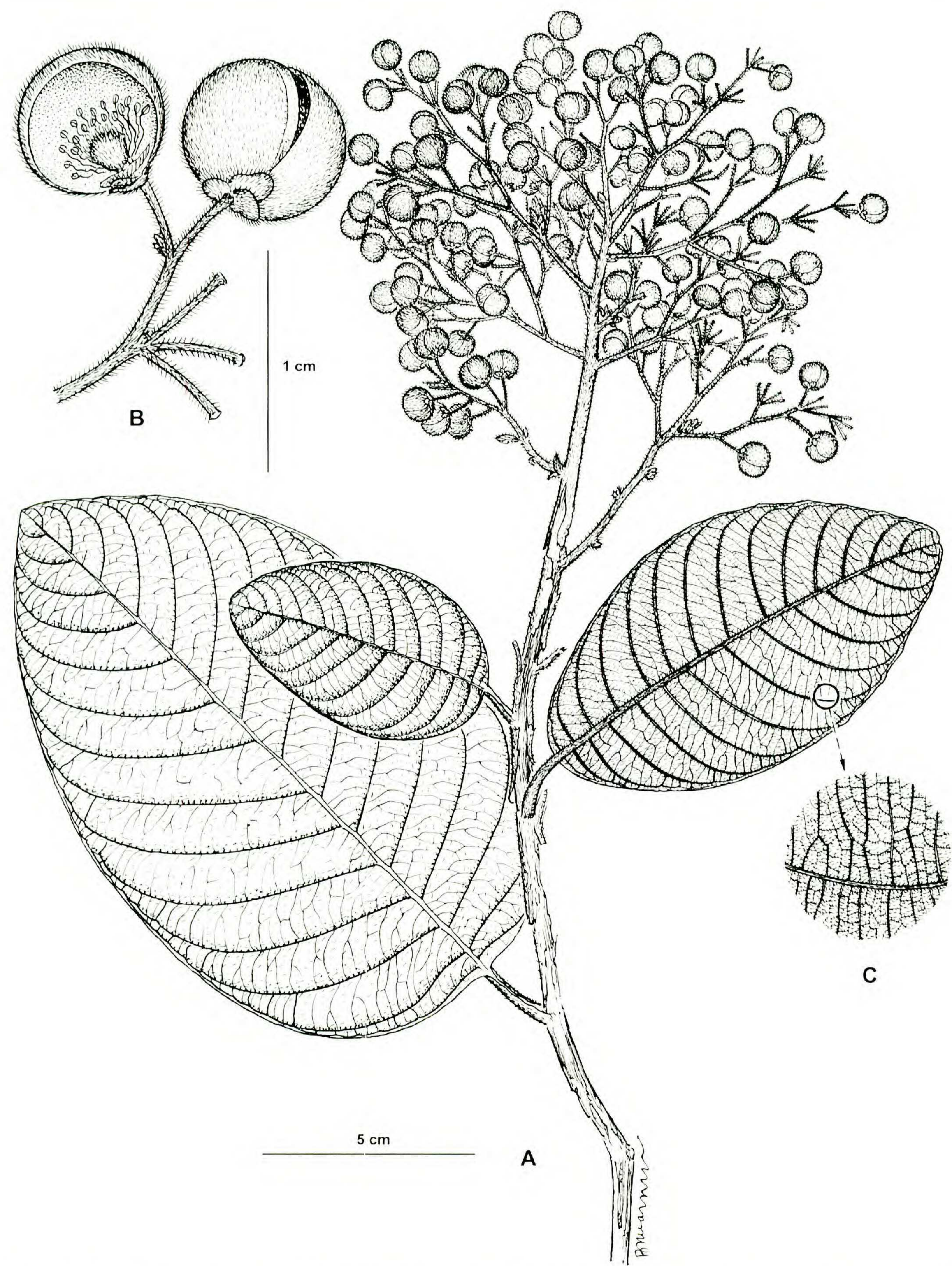


Figure 3. *Davilla neii* Aymard. —A. Branch with leaves and inflorescences. —B. Flower with an internal sepal removed showing the stamens and the carpel. —C. Abaxial leaf pubescence. Drawn from the holotype, *M. Nee* 42366 (INPA).

orbicular, 1–2 mm, the inner 2 broadly ovate to orbicular, 3–4 × ca. 8 mm, papyraceous when mature; petals 3 to 4, yellow, ovate, glabrous on both surfaces, 3–4 mm. Stamens 50 to 60, filaments 2–3 mm, glabrous, anthers 0.2–0.3 mm, glabrous; carpel 1, ca. 2 mm, densely hispid to incanous-pubescent, style ca. 3 mm, glabrous, stigma capitate. Fruit and seeds not seen.

Distribution and habitat. *Davilla neei* is distributed very locally in central Amazonian lowland forest, in Amazonas and Para states, Brazil, where it is a characteristic liana in the canopy trees in the study site of the Biological Dynamics of Forest Fragments Project, a collaborative project developed between the National Institute for Amazonian Research (INPA) and the World Wildlife Fund that assesses the effect of reduction in rainforest area on biological diversity, particularly on the number of species of plants and animals in remnant patches (Bierregaard Jr. & Gascon, 2001; Laurance, 2001).

IUCN Red List category. Although this new species has been collected many times, this taxon should be included in the category VU (Vulnerable) according to IUCN Red List criteria (IUCN, 2001) because it is located in the central Amazonian forests, a widely deforested region. However, the precise conservation status of the population(s) has not been determined.

Relationships. By its petioles, midribs, and lateral veins on the lower leaf blade adpressed-pubescent, with trichomes white or brown, *Davilla neei* is most similar to *D. kunthii* St. Hilaire in section *Davilla*. However, this new species differs principally by the leaves 7–15 cm wide, broadly ovate to orbicular, the margins coarsely serrate; petioles 5–6 mm wide, densely adpressed incanous-pubescent; inflorescence 10–11 cm long; the inner sepals broadly ovate to orbicular, 3–4 mm long; petals 3–4 mm long, ovate; filaments 2–3 mm long; and the carpel densely hispid-incanous. In contrast, *D. kunthii* has leaves only 2–9 cm wide, elliptic to suborbicular, sometimes lanceolate, margins entire or dentate; petioles 2–4 mm wide, adpressed white-pubescent; inflorescence 10–25 cm long; inner sepals elliptic, 4–6 mm long; petals 4–6 mm long, obovate; filaments 4–5 mm long; and the carpel glabrous, rarely sparsely pilose.

In Aymard (2002), this species was treated as “*Davilla* sp. B.”

Etymology. The specific epithet honors the collector of the type, Michael Nee, noted authority on the Solanaceae and the Neotropical flora.

Paratypes. BRAZIL. **Amazonas:** Manaus, Rodovia BR 174, Km 64, 23 km E on ZF3, Fazenda Esteio, Projeto Dinâmica Biológica de Fragmentos, *M. Nee* 42366 (INPA, NY, PORT, US); Reserva 1501 (Km 41) of the WWF/INPA MCS project, *S. A. Mori & M. Wong* 19813 (MO, NY, PORT). **Pará:** Macau, Rio Maicuru, 300 m, *J. J. Strudwick et al.* 3459 (NY, PORT).

Acknowledgments. I thank L. Campbell (NY), G. Romero (AMES), and V. C. Hollowell (MO) for their observations and corrections on the manuscript. I am grateful to B. Manara (VEN) for revising the Latin descriptions and for preparing the illustrations, and to the Missouri Botanical Garden and New York Botanical Garden staff for making their facilities available for my research.

Literature Cited

- Aymard, G. 1998. Dilleniaceae. Pp. 676–685 in P. Berry, B. Holst & K. Yatskievych (editors), *Flora of the Venezuelan Guayana*, Vol. 4. Missouri Botanical Garden Press, St. Louis.
- . 2002. A new species of *Davilla* (Dilleniaceae) amongst the Flora São Paulo, Brazil. *Acta Bot. Venez.* 25(2): 153–159.
- Bierregaard, Jr., R. O. & C. Gascon. 2001. The Biological Dynamics of Forest Fragments Project: Overview and history of a long-term conservation project. Pp. 5–12 in R. O. Bierregaard Jr., C. Gascon, T. E. Lovejoy & R. C. G. Mesquita (editors), *Lessons from Amazonia (The Ecology and Conservation of a Fragmented Forest)*. Yale Univ. Press, New Haven.
- IUCN. 2001. IUCN Red List Categories and Criteria Version 3.1. Prepared by the IUCN Species Survival Commission IUCN, Gland, Switzerland.
- Kubitzki, K. 1971. *Doliocarpus*, *Davilla*, und verwandte Gattungen (Dilleniaceae). *Mitt. Bot. Staatssamml. München* 9: 1–105.
- Laurance, W. F. 2001. The hyper-diverse flora of the central Amazon: An overview. Pp. 47–53 in R. O. Bierregaard Jr., C. Gascon, T. E. Lovejoy & R. C. G. Mesquita (editors), *Lessons from Amazonia (The Ecology and Conservation of a Fragmented Forest)*. Yale Univ. Press, New Haven.